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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/848,655	05/04/2001	Albert Sicignano		7254

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EXAMINER
ROSARIO-VASQUEZ, DENNIS

ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 02/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.		Applicant(s)
Office Action Summary	09/848,655		SICIGNANO ET AL.
	Examiner		**Art Unit**
	Dennis Rosario-Vasquez		2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 May 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *May 04, 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities:

Page 4 of the specification should be deleted and a renumbering of the

specification is requested.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2.   Claims 1,2,3,4,5,6 and 9-11 are rejected under 35 U.S.C. 102(b) as being

anticipated by Elings et al. (US Patent 5,077,473 A).

Regarding claim 1, Elings et al. discloses a method of quantitative determination

of an image drift (Elings et al. compensates for unwanted drift at col. 7, lines 37,38) in a

digital imaging microscope (fig. 3 is an alternative microscope of fig. 2 that can be used

with a programmable logic device at col. 7, lines 39-42 and col. 7, lines 48,49),

comprising the steps of using a pattern (fig. 4 and fig. 5, num 44) which has a plurality of

features (numeral 44 has four circles that are spaced apart from each other) spaced

from one another into mutually perpendicular directions (Using figure 4, two of the

circles in the vertical direction or axis are perpendicular to two circles in the horizontal

direction or axis.); producing a set of images of the pattern with certain time intervals therebetween (Using figures 4 and 5, Elings et al. uses the same image with one mark initially for frame 1 of figure 4 then another mark is made on the image at a later time for frame 2 of figure 5 at col. 8, lines 17-24) ; and determining an offset (Figure 5, label: "DISTANCE MOVED") of each of the features in the set of the thusly obtained images (figures 4 and 5) as an image drift.

Claim 2 has been addressed in claim 1 above.

Regarding claim 3, Elings et al. discloses a method as defined in claim 1; and further comprising determining a center of each feature (Elings et al. finds the center of images implicitly as shown in figure 5. The arrow of figure 5 labeled as "DISTANCE MOVED" shows the right end of the arrow that is at the center of the bottom most circle and the top most circle for determining the center of the circles in a vertical fashion for horizontal movement as depicted by the arrow labeled as "DISTANCE MOVED". In a similar fashion, the two remaining circle's center can be determined for vertical movement.), said determining an offset includes determining an offset of said center of each of said features in said set of images of said pattern.

Regarding claim 4, Elings et al. discloses a method as defined in claim 1, wherein said determining an offset includes determining a center of each of said features and then determining a central point between said centers of said features (The central point is located between the two circles or features on the horizontal axis of figure 5. An operator initially determines the center using the cross-hairs as shown in figure 4, then a mark corresponding to the center is applied to the

image at col. 8, lines 13-15. Next, drift has caused the image to move in the horizontal direction and not in the vertical direction as shown in figure 5; therefore the system has to correct for horizontal drift only.), said determining of an offset includes determining an offset of said central points in said set of images (Elings et al. compensates for drift when triggered for each scan of the image at col. 8, lines 15-17).

Claim 5 was addressed in claim 1 above.

Regarding claim 6, Elings et al. discloses a method as defined in claim 2, wherein said determining of an offset of said centers of said features is performed so as to determine turning ("drift velocity vectors": Elings et al. @ col. 5 , line 33) of said centers of said features.

Regarding claim 9, Elings et al. discloses a method as defined in claim 1; and further comprising a step of representing the thusly determined image drift graphically on a display screen (An operator scans an satisfactory image at col. 8, lines 14. Therefore, implicitly stated, an operator has to be able to see the image graphically on a display and determines whether the scanned image is satisfactory or not.)

Regarding claim 10, Elings et al. discloses a method as defined in claim 1; and further comprising representing the thusly determined image drift in a digital form (fig. 3, numeral 36:"D TO A CONVERTER").

Regarding claim 11, Elings et al. discloses a method as defined in claim 1; and

further comprising comparing the thusly determined drift (Figure 3, numeral 18

computes the drift velocity at col. 8, line 19) with a predetermined image drift threshold

(High or rapid drift velocities at col. 10,lines 22-25); and providing an answer whether

the scanning electron microscope (fig. 3 is a scanning probe microscope at col. 7, line

11) with the thusly determined drift can be utilized or not for metrology purposes (The

operator is informed that drift compensation is not possible at col. 10, lines 25-27.).

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Elings et al. (US Patent 5,077,473 A) and in view of Koitabashi et al. (US Patent

5,640,243 A).

Regarding claim 7, Elings et al. teaches a method as defined in claim 1; and

further comprising providing a plurality of patterns (Elings et al. teaches a pattern shown

in figure 4, num 44 in the first time instant and a similar mark shown in figure 5, num. 44

on the same image at another time instant.) consisting of a size of each feature (Elings

et al. considers atomic dimensions with the features at col. 3, lines 56-58) to be

performed by a scanning electron microscope ("scanning probe microscope" at col. 7,

line 11 and figure 4).

Elings et al. does not teach the remaining portion of claim 7 of selecting a

pattern; however, Koitabashi et al. does provide selecting a plurality of different patterns

(Koitabashi et al. teaches that a template with a mark can be an arbitrary figure such as

a circle as the mark at col. 4, lines 59-62. Note that Koitabashi et al. is using a pattern

as shown in figure 3A that has 5 marks that will be matched to the templates of figures

3B,3C and 3D) in correspondence with a size range (Koitabashi et al.: figure 3A,

numerals iw1, iw2,iw3, iw4, and MW1 are ranges used for pattern matching of a mark of

figure 3A with a set of templates (figs. 3B,3C, and 3D).) are of measurements

(Koitabashi et al.: "displacement or deviation" at col. 6, lines 4-6).

It would have been obvious at the time the invention was made to one of ordinary

skill in the art to use Koitabashi et al.'s pattern matching for finding a displacement

"between the centers of the indication mark images (fig. 3A, labels: iR1,iR2,iR3, and

iR4) and the reference mark image's center MR1 (fig. 3A) (col. 6, lines 4-6))for each

pattern (figure iR1,iR2,iR3,iR4, and FM) with Elings et al.'s centering as discussed

in claim 2 above because Koitabashi et al.'s pattern matching provides "accurately"

setting the center of a template for pattern matching (Koitabashi et al. at col. 4, lines 52-

57) ;therefore all the templates combined at col. 4, lines 52-54 will accurately locate the

displacement of the image S1 of figure 3A.

Regarding claim 8, the combination of Elings et al. and Koitabashi et al. teaches

a method as defined in claim 1; and further comprising providing a plurality of patterns

which are different from one another by at least one parameter selected from the group

consisting of a size of each feature and a magnitude of a space between the features,

and selecting a pattern (addressed in claim 7 above) in correspondence of a drift

acceptable by a user of the scanning electron microscope (Elings et al. teaches that an

operator can correct the image drift again if the drift velocity changes with time at col. 8

,lines 26-28).

Conclusion

5.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

Ehrichs (US Patent 6,522,776 B1) is pertinent as teaching a method of using a

test pattern (fig .2, num 32) for determining the amount of reticle tilt.

Nakagawa et al. (US Patent 5,859,707 A) is pertinent as teaching a method of

using orthogonal index marks that are centered in light-blocking plate that is used for
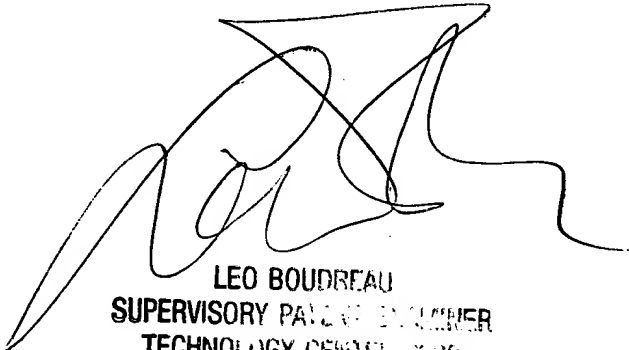
alignment (col. 56, lines 32-41 and figure 23e).

Suwa (US Patent 4,657,379 A) is pertinent as teaching a method of finding the

center of a pattern (fig. 1, num. 20) using marks (fig. 1, M! and M2).

6.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Dennis Rosario-Vasquez whose telephone number is

703-305-5431. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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